# ITOS 7-4 Release Notes

Integrated Test and Operations System
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# Release 7-5

October 6, 2006

## Highlights

- Added support for automatically compensating in the conversion of a date mnemonic for roll-overs, resets, and leap-seconds. See `Time Adjustments` for details.
- Added support for STOL `PREVIEW` or two step directive mode for GLAST.
- Added new `LIMITVIEW` page that displays all mnemonics currently in limit violation.
- Added new `IPDU` Command Wrapper for GLAST MOC support of I&T facility.
- Added capability of creating pseudo mnemonics whose values are calculated during decom. See `Equations in Decom` for details.
- See Enhancements section below for more details.

## Special Instructions

- ITOS Operational Database files built with previous releases will not work with this release. Please rebuild existing ITOS ODBs before trying to use them with this release.

## Enhancements

- Added support for automatically compensating in the conversion of a date mnemonic for roll-overs, resets, and leap-seconds when the value is decommutated.
- Bugzilla item #306 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=306`): Added the STOL `PREVIEW` directive to turn on and off a mode whereby interactive directives and `ASK` directive responses are echoed to the log as '`STOL_PREV`' events. A mouse click is required to take the action or commit the response. Also added '`preview`' buttons to the STOL entry and `ASK` popup windows to allow the user to preview selected actions when not in preview mode.
- Bugzilla item #311 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=311`): Added support for the Avtec PTP's `IPDU` command header.
- Bugzilla item #295 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=295`) and Bugzilla item #319 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=319`): Added support a new page `LIMITVIEW` which shows all mnemonics currently in limit violation. Also see `PAGE` directive.
- Added capability of creating pseudo mnemonics whose values are calculated during decom. This allows expressions to be evaluated at the time of decom so the resulting value is not disassociated from the packet time. See `Equations in Decom` for details.
- Bugzilla item #271 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=271`): Modified telemetry playback so that if no rate is given, data will be played as fast as possible. Also increased the maximum value on the

playback GUI's rate slider to 5MB. (Making it any higher causes the rate slider to lose too much fildelity.)

- Modified messages from the socket library so they now contain the socket name. Modified some applications so that they name their sockets appropriately.
- Modified STOL so that `WAIT` directives do not generate event messaegs on entry and timeout when run from a background proc.
- Modified the telemetry to use UTC rather than local time in simulated packet time.
- Modified the `pkt_sync` utility to accept an optional second command line argument giving the per-packet trailer length.
- Modified the `frame_sorter` program so socket status messages now contain a socket name. Socket names are '`input`' for the input socket, '`control`' for the socket connected to the telemetry controlller, and '`output_x`' for packet or frame outputs, where the '`x`' is an output number. Also added code to name the input socket in the packet and frame dump program.
- Updated some language in the Equation Processor / Configuration Monitor User's Guide, and added documentation on comments in '`.cfg`' files.
- Added additional documentation on background procs to the STOL `START` directive.
- Removed the `xpr` program from ITOS since we now use the convert tool which is more flexible.

## Bug Fixes

- Bugzilla item #289 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=289`): Fixed a bug in `frame_sorter` which caused it to exit with a `select()` error under some circumstances when the `tfdump off all` directive was given, and a tfdump had been dismissed with the mouse.
- Bugzilla item #300 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=300`): Fixed a bug which prevented users from entering text into text fields of the display builder property sheets for the plot and stripchart beans.
- Bugzilla item #301 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=301`): Fixed a bug which caused xorchksm to fail on commands with no application data.
- Bugzilla item #307 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=307`): Fixed a bug in GUI STOL which prevented command field radio buttons from showing a depressed state when they had been selected.
- Bugzilla item #308 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=308`): Fixed support for exchanging command and telemetry with Goddard's SpaceWire Test Set (SWTS) (based on Goddard's NT-GSE). The SWTS side of the interface was designed for the ASIST T&C system, so the ITOS mimics the ASIST for this interface. The command wrapper would not accept a zero as the spacewire address.
- Bugzilla item #312 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=312`): Fixed a bug the implementation of mnemonic arrays in the Java applet that instantiates ITOS text pages in a web browser.

- Bugzilla item #313 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=313`): Fixed a bug the applet that instantiates ITOS text pages in a web browser which caused it to not display some mnemonic values.
- Bugzilla item #314 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=314`): Added code to emit an error message if the user attempts to assign a value to a command field which is not big enough to contain the value. permitted
- Bugzilla item #316 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=316`): Fixed a bug which caused the applet which instantiates ITOS text pages in a web browser to repeatedly report '`unknown foreground color`'.
- Bugzilla item #317 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=317`): Fixed a bug in the STOL `OPEN` directive which prevented it from accepting TCP connections.
- Bugzilla item #318 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=318`): Fixed a bug which caused STOL to crash when Commands are Disabled Under Red Hat Enterprise Linux 4.
- Bugzilla item #320 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=320`): Fixed a bug in archive playback which caused playbacks with no stop time to fail.
- Fixed a bug in data-directed decom (configured with '`SEL`' database records) which caused the decom to change additional, incorrect mnemonics when processing a packet map selected by an '`SEL`' set.
- Fixed a bug the applet that instantiates ITOS text pages in a web browser which caused it to not display some values when the questionable quality flag was set for the associated mnemonics.
- Fixed a bug which prevented `frame_sorter` from releasing frame archive references when the packet extractor encountered the wrong VC or the frames on a VC are marked as containing private data.
- Fixed a bug in the program which instantiates local event displays which allowed a buffer overrun and subsequent program crash when event messages were longer than about 1240 characters.
- Fixed a bug in how the archive playback program ordered directory listings so that it now works consistently across all file systems.

## Known Issues

- The STOL interpreter emits the message '`DSP_WARN: Stol: X Warning - Cannot convert string "%s" to type %s`' warning the first time it opens a procedure. This applies both to foreground and background STOL interpreters.

# Release 7-4 Patches

## Patch 2

Sept 1, 2006

## Highlights

- Eleven(11) reported bugs corrected.
- Added ten(10) requested enhancements for GLAST and LRO including:
  - Merging short and long descriptions missing <HTML> tag in dbxodb for Glast.
  - dbxodb allowing integers(including hex format) for where floats are defined for LRO.
  - Reliable socket connections to ITOS events for Glast.
  - STOL to handle maximum negative integer value for Glast.
  - EDT CD16A serial communications board support for LRO.
  - SWTS interface for LRO.
  - Added a new STOL SX function `ISNUMBER`.
- See Enhancements below for details.

## Special Instructions

- This patch modifies global mnemonics to the ITOS inputs to the database, so we recommend that users rebuild the database after installing this patch or certain features may not work properly.

## Enhancements

- Bugzilla item #293 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=293`): Allow `dbxodb` program to handle long descriptions that don't contain <HTML> tag as requested by GLAST project. This allows the HTML documentation that is built to combine the short and long descriptions back together properly.
- Bugzilla item #294 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=294`): Allow program dbxodb to accept Integer and Unsigned input when floating point is required such a telemetry limits. This will allow a hex value (i.e. 0xf123) to be also be used for a float value as requested by LRO project. The integer value is automatically converted to float by the dbxodb parser.
- Bugzilla item #299 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=299`): Allow ITOS to communicate both telemetry and commands via the ASIST/SWTS interface in use in the LRO FSW Lab.

- Bugzilla item #303 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=303`): Added the SWTS TXPKT command wrapper.
- Added new Reliable Connection feature to Remote ITOS Events which involves a new remote message "idEnsureDelivery" via port 6066. See the Evtdsp messages (`../event/Evtdsp_messages.html`) for details on message format. This is not applicable for remote connections made through the Event Forwarder on port 6067.
- Modified STOL and SX to handle "maximum negative integer value" constants properly requested by GLAST. Also changed constants that exceed "maximum signed integer value" to be converted to string rather than truncated to a modulus of max integer.
- Modified STOL to allow a command mnemonic name in a CMD directive to be an expression instead of a string. This was requested to allow passing the mnemonic name as an argument to a proc.
- Modified `FrameSync` program to handle modifications to support the EDT CDA16 I/O board for the LRO instrument labs. Includes new global mnemonic `GBL_FRMSYNC_RATE`.
- Added the applications `itos_edt_cmd_adapter` and `itos_edt_tlm_adapter` to provide stand-alone interfaces with the EDT PCICDa board.
- Added the `itos_cmd_decoder` application. This program performs synchronization and decoding of CCSDS CLTUs, and writes the CLTU in ASCII-hex to the log. It is intended to be using with `itos_edt_tlm_adapter` to decode outgoing command which are looped back in the wiring harness to an input channel of the EDT PCICDa board.
- Added an "-nohtml" option to '`mkodb`' shell script to allow the script to not build the HTML documenation.
- Added new function to STOL SX library called `ISNUMBER` that returns true if the SX variable is a signed int, unsigned int or float value. Also added documentation for SX Functions that had little or no definitions.
- Added missing documentation and extra examples for the STOL WRITE directive.
- Updated the telemetry and command system documenation to include FrameSync program changes for EDT CDA16 I/O board and description of the SMEX/LEO-T header.

## Bug Fixes

- Bugzilla item #290 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=290`): Removed erronious debug ERROR message from /RAWTF directive. Also removed extra "/" that ends up in event log and sentq for RAW commands.
- Bugzilla item #292 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=292`): create_arch_hdr program didn't handle wrappers properly for packet archives. It was modified to include the encapsulation list and create the filter list correctly.
- Bugzilla item #296 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=296`): Mnemonics defined with limits and XPR conversions could crash tlmClient due to passing a pointer not correctly malloc'd. This was corrected.

- Bugzilla item #297 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=297`): Fix an omission in the ITOS command library that didn't handle TIME44 time types on CMD fields that are variable causing a TCW Fault to be generated.
- Bugzilla item #298 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=298`): Fixed command checksum routine parameter list handling for default cases (GBLCHECKSUM or LCLCHECKSUM).
- Modified the '`rand`' command wrapper so it uses the correct algorithm. It had been using the telemetry algorithm, rather than that specified for commanding by the CCSDS.
- Bugzilla item #300 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=300`): Corrected an issue related to the use of the keyboard input map and text fields in the property editor of the Java Display Builder.
- Bugzilla item #302 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=302`): Fixed a bug in the stchksm checksum routine where the wrong offset into the packet was being used (i.e. wasn't skipping over the secondary header).
- Bugzilla item #304 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=304`): Fixed a bug in cmd_load program that was ignoring the `GBL_LOAD_SEQUENCE` mnemonic flag and increasing the sequence counter field even when it shouldn't.
- Bugzilla item #305 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=305`): Fixed a bug in cmd_load program that the command packet was not being zero'd out prior to use leaving ramdom garbage to in fields that get OR'd into such as the OFFSET field.
- Fixed a bug in extracting packets from AOS frames triggered when the frame insert zone length is zero.

## Patch 1

June 7, 2006

## Highlights

- Added new options to control background STOL procs such as `START QUERY` and `KILLPROC BACKGROUND`.
- New telecommand checksum routine "xorchksm" (or "xor") added for LRO. For details, see section "Checksum Routines" in *ITOS Checksum Routines*. All '`xorchksm`' routine defaults are set for the LRO implementation.
- GPIB capabilities enhanced.
- Pulldown menus added to the GUI STOL for GPIB commanding.
- Command checksum routines now can insert the calculated checksum value into any given command field. If no checksum field is given, the calculated value is appended to the end of the packet or frame. See section "Command Checksums" in *The ITOS Command Subsystem*.

## Special Instructions

- This patch modifies global mnemonics to the ITOS inputs to the database, so we recommend that users rebuild the database after installing this patch or certain features may not work properly.
- A global checksum field should be defined that gives the placement of the telecommand checksum value. For LRO, the checksum value is to be inserted into the packet secondary header. For details on defining a global checksum field, see section "All Command Packets" in *The ITOS Command Subsystem*.

## Enhancements

- GFEP users guide documentation added.
- Added documentation on starting background procs.
- Added a `QUERY` option to the STOL `START` directive to list status for currently running foreground and background procs.
- Modified the `START` will directive so that if a parameter to a proc is missing, STOL will issue only a warning and not halt the interpreter. Missing parameters will be set to NULL which can be tested for in the proc using the `ISNULL` function. Other attempts to use NULL parameters will stop the proc.
- Added to the STOL `KILLPROC` directive a `BACKGROUND` *pid* option to kill a background STOL proc.
- Modified STOL procs running in the background so that the informational messages for `LET`, `SET`, `GET`, `GPIB SEND`, and `GPIB RECEIVE` will not go to the event log or event display.
- Modified the `GPIB RECEIVE` directive to add an optional parameter for the variable to receive the value read. If the variable given is a mnemonic, this automatically will convert the received string value to the type of the mnemonic; otherwise, the variable is assigned the string.
- Modified the `GET` directive directive to allow the syntax '*pid=par*' the same as in the `SET` directive.
- Added pulldown menus to the GUI STOL for GPIB commanding. Using these displays will allow for viewing a list GPIB controlled devices that have been assigned to GPIB globals and displaying associated commands that have been added to the Device.conf file. This GUI will also formulate STOL `GET`, `SET`, `GPIB POLL` and `GPIB RECEIVE` directives.
- Modified cfgmon '`IF ... THEN`' parsing to execute assignment statements in the '`THEN`' clause internally instead of sending them to STOL. This will make cfgmon faster and more efficient.

## Bug Fixes

- Bugzilla item #173 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=173`): Fixed a bug which prevented cfgmon from setting the

result mnemonic's '`exists`' flag properly. This caused displays to show a value of '`NV`' for mnemonics which were not given initial values in their DBX definition.

- Bugzilla item #274 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=274`): Fixed an oversight in command building where the default values for cmd fields of string type were being truncated to a maximum length of 8 characters instead of the length of the field. This bug was reported fixed in Release 7-4, but was accidentally left out.
- Bugzilla item #276 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=276`): Changed the handling of `TIMET42` and `RTIMET42` to make the coarse time field unsigned so rollovers occur in 13.5 years. This bug was reported fixed in Release 7-4, but was accidentally left out.
- Bugzilla item #277 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=277`): This bug was closed in Release 7-4, but was re-opened because the fix was incomplete. The remaining problem was fixed by making the connection between the ITOS programs `dsp_evtdsp` and `dsp_remote` blocking rather than non-blocking.
- Bugzilla item #281 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=281`): Fixed several memory leak problems in handling command directives.
- Bugzilla item #282 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=282`): Changed all STOL expression warning messages to operator error messages so STOL procs will halt on problems in expression evaluation. This prevents the result of an erroneous computation from being used in telecommands and elsewhere.
- Bugzilla item #283 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=283`): Fixed a bug with the `GBL_CHKSMROUT` deprecation. Although documentation said this was deprecated but could still be used the code didn't work that way. The code has been fixed.
- Bugzilla item #284 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=284`): Fixed an issue in Java displays that prevented limit colors from being displayed properly. When opening a page display remotely (in a Java applet), the limit color that was displayed on a mnemonic with a limit violation was one step behind the actual limit state.
- Bugzilla item #285 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=285`): Fixed a bug in the STOL `SIM CHG` directive that caused STOL to crash when trying to assign a value that can't be converted to the mnemonic type; for example, assigning a non-numenric string to an integer mnemonic.
- Bugzilla item #286 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=286`): Fixed the '`swaschksm`' routine so that it operates at the packet level rather than the frame level. NOTE: Rather than specifying this very mission specific checksum routine, one can set `GBL_CMD_CHKSM_PKT` to '`chksm:0,0,1,2`' and accomplish the same thing.
- Bugzilla item #287 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=287`): Fixed '`dpuchksm`' routine. This got broken in the previous release

when the code was converted over to use the more generic '`chksm`' routine. The instruction to subtract one from the summed value got omitted so the calculated value was off by one.

- Bugzilla item #291 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=291`): Fixed '`cmd_load`' program to cause a command load to fail if CmdBuildPkt() fails due to a parsing error in a /CMD (such as a missing or incorrect field) in the load file. Previously the load could have transmitted incorrect commands.
- Fixed what happens when `ENABLE GPIB` and `DISABLE GPIB`. Now each time you `ENABLE GPIB` the '`Device.conf`' file is read and when you `DISABLE GPIB` the table is cleared. This allows the user to make updates to the '`Device.conf`' file and have them reread.
- Modified the `dbxodb` program to issue a warning instead of an error when the dump AppID in a `CMD` record does not have a corresponding telemetry packet.
- Fixed a bug in the `frame_sorter` program that prevented unpacking using the packet sync method used by GLAST on reassemblers started after the connection was acquired.

# Release 7-4

March 22, 2006

## Highlights

- A new STOL `GET` directive has been added.
- Data-directed unpacking using the `SEL` database exchange record now is supported.
- Preliminary support for the CCSDS File Delivery Protocol (CFDP) has been added.
- Significant changes were made to the telecommand subsystem to support CFDP.
- Seventeen bug reports have been closed.

## Special Instructions

- ITOS Operational Database files build with previous releases will not work with this release. Please rebuild existing ITOS ODBs before trying to use them with this release.
- Any CCSDS telecommand frame level checksum that was being applied to all commands via assignment to `GBL_CHKSMROUT` should now be assigned via the new global mnemonic `GBL_CMD_CHKSM_TF` instead.
- Any CCSDS telecommand packet level checksum that was being applied to all commands via assignment to `GBL_CHKSMROUT` should now be assigned via the new global mnemonic `GBL_CMD_CHKSM_PKT` instead. `GBL_CHKSMROUT` has been deprecated, but is still supported under this release, and, if used, must reference a packet level checksum routine.

## Enhancements

- Bugzilla item #216 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=216`): Added handling of database `SEL` records which is used in defining data-directed unpacking of packets. This allows the user to select the layout of part of a packet based on a value contained in the packet.
- Bugzilla item #267 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=267`): Added the `GET` directive to STOL. This directive, the companion of the `SET` directive, provides a higher-level way to read values from GPIB and serial devices.
- Added new global mnemonic `GBL_URLBROWSER` that holds the name of the Web Browser. Defaults to '`mozilla`', but can be changed in the '`itosrc`' file or by STOL.
- Added support for CFDP file transfers to and from ITOS. The CFDP application can perform transfers using CCSDS packets or raw CFDP PDUs over TCP or UDP sockets. Generally speaking these sockets are connected to a telemetry source and to the ITOS command subsystem. See the ITOS CFDP User's Guide for details.
- Enhanced STOL server sockets so they can be set up to automatically reconnect after the socket connection breaks. The STOL `OPEN` directive option is `AUTORCN`.

- Modified the STOL `OPEN` directive for serial ports so it can accept any baud rate supported by the host operating system. This will allow for speeds above 38400 which commonly are available on modern computers.
- Modified STOL `WAIT UNTIL` directive to allow expressions that do not contain mnemonics. These expressions will be reevaluated once a second until the WAIT completes.
- Added new global mnemonic `GBL_PLAYBACK_ACTIVE` to indicate whether or not an archive playback is active. The value 1 indicates a playback is active; 0 indicates no playback is in progress.
- Added new global mnemonic `GBL_CMD_CHKSM_PKT` to indicate the name of the packet level checksum routine to apply to all commands. This is a replacement of the deprecated global mnemonic `GBL_CHKSMROUT`.
- Added new global mnemonic `GBL_CMD_CHKSM_TF` to indicate the name of the transfer frame level checksum routine to apply to all commands. The checksum routine must be a CCSDS Transfer Frame level routine.
- Added generic CCSDS telecommand packet level summation checksum routine called 'chksm' that takes arguments for number of bytes to skip, number of trailing bytes to skip, size of word to sum (1,2,or 4 bytes) and size of checksum value (1,2, or 4 bytes). See checksum routines for details.
- Added `MKEPOCHDATE` Sx function to go along with MKDATE. MKDATE uses unix epoch when computing date. MKEPOCHDATE allows an epoch of the user's choice to be used.
- GMSEC programs were built using the GMSEC API version 1.3.1
- The graphical components surrounding the page displays in the Java based Page Builder and Page Display applications have been modified to utilize the Swing toolkit. The appearance of the menus, tool bar buttons, and status area have changed; however, the functionality of these areas has not been changed. Additionally, five new graphic beans have been added: Rectangle, RoundRectangle, Ellipse, Line, and Arc. There were also numerous smaller improvements made to brush up the Page Builder and Page Display interfaces, please see the `Graphics telemetry pages` document for more details.

## Bug Fixes

- Bugzilla item #33 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=33`), 34 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=34`): Fixed `IF(` and `DO(` bugs where the STOL directive parser would fail in a proc that had an `IF` or `DO` and no space before the `(`.
- Bugzilla item #230 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=230`): Fixed a design flaw where the Java Display Server (`IJserver`) and the DataPoint Server (`dp_server`) are started from the itos shell script instead of start/stop being controlled by the STOL "enable/disable dsp" directive.
- Bugzilla item #239 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=239`): Fixed ASK window resizing problem when a proc has consecutive ASK directives.

- Bugzilla item #254 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=254): Fixed a bug in STOL procs where an ELSEIF would get a parse error when the expression to be tested is a telemetry mnemonic. This bug popped up from a previous patch of ITOS Release 7-3.
- Bugzilla item #256 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=256): Fixed a bug in snaps of pages using mnemonic arrays which caused the snap to always display the value for array index 0 value instead of the index given.
- Bugzilla item #266 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=266): Removed the GNU Java regex package in favor of the built in regex shipped with Java since 1.4.0.
- Bugzilla item #272 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=272): Fixed a bug in the telemetry subsystem which prevented workstations from acquiring on a certain packet streams.
- Bugzilla item #273 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=273): Fixed bugs in the telemetry subsystem's handling of multicasting and broadcasting, and in some related event messages from the sockets library.
- Bugzilla item #274 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=274): Fixed an oversight in CmdBuildPkt() where the default values for cmd fields of string type were being truncated to a maximum length of 8 characters instead of the length of the field.
- Bugzilla item #275 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=275): Fixed bug where high rate playbacks would crash the tlmClient program.
- Bugzilla item #276 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=276): Changed the handling of TIMET42 & RTIMET42 to make seconds field unsigned so rollovers occur in 13.5 years.
- Bugzilla item #277 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=277): Fixed the event forwarder to allow its queue depth be other than an internal size of 20. The default is now 1024 and can be overridden as a command line argument by setting the ITOS_EVTFWD_QSIZE environment variable in the 'itosrc' file.
- Bugzilla item #278 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=278): Fixed a 'BadAccess' X Window System error in the 'sentq' page when selecting a command in the sent queue list to be displayed..
- Bugzilla item #280 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=280): Fixed database generation problems with regards to the XPR record corrupting memory of other database information — mainly command mnemonics.
- Fixed a potential bug in the atodate() parser that would crash when building on 64 bit non-SPARC processors in 64 bit mode.
- Fixed a minor bug in dbxodb building 'tcvolII' output for time mnemonics initial value coming out "-T" or "-D".

- Fixed a bug in the telemetry simulator's rate timer handling which sometimes caused two frames on each VC to be output for each interval. (Unfortunately, this has introduced another bug causing the simulator to emit `select()` errors under certain circumstances.)
- Added a missing link in the HTML version of the Socket's API user's guide.
- Fixed a message in the telemetry simulator in which it reports the local port number it is using to send telemetry.

# Release 7-3 Patches

## Patch 8

Dec 19, 2005

## Enhancements

- Made the HEADER-VERSION field in the GMSEC message header user configurable `GBL_GMSEC_HEADER_VERSION`. By default the value of this field is the version of the GMSEC IFSpec used for defining the GMSEC messages and subjects.

## Bug Fixes

- Fixed handling of TTIM data type with an 8 bit fine time. Previously only worked for 16 bit fine time.
- Fixed bug where the GMSEC log message publisher would crash if it received a garbled event message from the event forwarder.
- Fixed memory leaks in the GMSEC library and in the archived mnemonic value message generator.
- Bugzilla bug #263 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=263`): Corrected several memory leaks in the page display application. Additionally, resolved a bug that caused Motif to display garbage values momentarily when redrawing a page display that had been obscured by another window.
- Bugzilla bug #269 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=269`): Restructured the initialization of the IJServer so that it does not close the event FIFO if there is already an instance of IJServer running.
- Bugzilla bug #270 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=270`): X errors caused STOL to exit and shutdown ITOS without showing the operator why. Recoverable X errors are now trapped and displayed. Only fatal non-recoverable IO errors will exit STOL with an error value so the itos2 shell script will restart STOL.
- Fixed a bug in cmd_transmit which caused it not to retry a socket connection to the command host if the connection broke due to an abnormal socket reset which some front ends are known to do.
- Fixed Sampex History dump program. Program had not been updated since changes to TmPktItem which cause the internal array not to be initialized properly. Incorrect values in some of the structure cause a segmentation violation and crash.

## Patch 7

Nov 1, 2005

## Enhancements

- Added the GMSEC programs to the cleanup script.
- Added documentation for the GMSEC adapter programs.
- Bugzilla item #255 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=255`): Modified the '`ac`' directive to the `frame_sorter` (and `tmController`) application so the user can specify the wrappers which should be applied to packet streams. Wrappers continue to default to the '`itp anno12`' combination. To specify alternate wrappers, add the keyword '`wl`' followed by the list of wrappers immediately before the '`pkts`' keyword. An example is: '`ac server_tcp 31200 wl itp anno12aos pkts vc0`'. Note that if '`wl`' is given but not followed by a list of wrappers, no wrappers are applied to the outgoing packets. Wrappers should be given in order from outermost to innermost.

## Bug Fixes

- Fixed misspelling of the OCCURENCE-TYPE field in the GMSEC log message publisher.
- Fixed a typo in the gmsec_start procedure where GBL_ITOS_GMSEC_MISSION should have been GBL_GMSEC_MISSION.
- Bugzilla bug #249 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=249`): The popup menu in the sequential print application was being improperly added to a non-Motif widget. This issue has been corrected and it is now possible to open the sequential print application under the Gnome window manager.
- 253: The popup menu in the XRT based dsp_plot application was being improperly added to a non-Motif widget. This issue has been corrected and it is now possible to open the XRT based dsp_plot application under the Gnome window manager.
- Bugzilla bug #257 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=257`): It was not possible to snap print plots under Linux due to a lack of the '`xpr`' program. Snap printing of plots now utilizes the '`convert`' program from the ImageMagick package. Please note that it may be necessary to rename the ITOS '`convert`' script, located in the '`bin`' directory, to '`itos_convert`' in order to prevent its name from clashing with the ImageMagick '`convert`' program. Both may be present within the user's `PATH` environment variable.
- Bugzilla bug #264 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=264`): On Linux, when dates before 1970 were entered they would appear as -1, or 69-365-23:59:59.065536. This issue was resolved by fixing a bug in `atodate()` that was passing around a pointer to static memory returned by the `gmttime()` system call, instead of copying the contents of the returned structure into a local variable.
- Bugzilla bug #255 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=255`): Added a new annotation header, '`anno12aos`', in which the first two bytes are a copy of the first two bytes of the CCSDS version 2 frame

(VCDU) header. The corresponding bytes in the '`anno12`' header have the format of the first two bytes of a version 1 frame (Transfer Frame) header, and so is not compatible with AOS telemetry. Most importantly, the VC ID field is three bytes in the version 1 frame header and six bytes in the version 2 header.

- Fixed a bug in the telemetry simulator which caused an intermittent corruption of the frame first header pointer.

## Patch 6

Sept 23, 2005

## Bug Fixes

- Modified the 3 GLAST Front End Processor (GFEP) STOL procs that use `FastCopy` to transfer data to the GLAST MOC to use a new environment variable to add extra arguments to the '`fcopy`' invocation for data encryption. The data must be encrypted in order for the GFEP on the PIP WAN to initiate a connection to the MOC on the Restricted IONet. The affected procs are '`gfep_dirlist.proc`', '`gfep_hotkey.proc`' and '`gfep_setup.proc`'.
- Page display '`gfepstats.page`' was fixed back in June and was accidentally left out of patch 4. This is primarily an optional GFEP display.
- Fixed a bug with the GMSEC log message publisher program, gmpublog. The subject for this message was being created incorrectly. Also fixed a typo in the gmsec_start procedure where GBL_ITOS_GMSEC_MISSION should have been GBL_GMSEC_MISSION.

## Patch 5

Sept 12, 2005

## Special Instructions

- Patch 4 for Red Hat Enterprise Linux included a copy of a support library for EDT serial interface boards ('`libedt.so`') in the ITOS '`lib`' directory so the `FrameSync` application will run on systems without this library. For any system that *is* equipped with an EDT board, **this library must be removed** so ITOS will use the library already installed on the system.

## Bug fixes

- Fixed bugs in the `FrameSync` program found during GFEP testing including:
  - Fixed an error in inverted data handling which caused the first word after sync in the first frame not to be inverted, and consequently the VCID was wrong, a Reed-Solomon error occured, and the frame ended up in the wrong archive.

  - Moved the update of all status mnemonics to the status thread so the main code does no DBIF updates causing potential thread interaction which may have caused the application to crash.
  - Changed the terminate function/signal handler to disable all signals on entrence to it can't be call multiple times causing a crash.
  - Added a slip counter statistic that is displayed on exit. No mnemonic for this has been added, but one can be added later if desired.
  - Changed detection of overrun to be maximum number of buffers minus 2 because the EDT board uses double buffering.
  - Changed shut down of the status thread on exit so it uses a global variable instead of a `pthread_cancel()` because cancellation doesn't work properly in RedHat Enterprise Linux.
  - Changed raw file open routine so it does not `malloc()` and `free()` the file name but uses a static character array, and so lesson the likelihood of heap corruption.
- Changed to `gfep_setup` STOL proc to add more run time options including:
  - Added new environment variable `GFEP_GZIP_RAW` that allows for the post pass compressing of raw data files using `gzip` program to save disk space. This can be configured in the '`itosrc`' file.
  - Added new environment variable `GFEP_FEP_BITSLIP` that if specified allow the setting of the allowable bit slips in the `FrameSync` program other than the default '`3`'. This can be configured in the '`itosrc`' file.
  - Added a dump of the RAID status to the event log with the rest of the end of pass statistics.
- The GMSEC application `gmreqval` now subscribes to the mnemonic value messages that it requests, so it can be expanded upon to extract the message fields and do something useful with the mnemonic values. It also now accepts optional parameters for dumping the received value messages (good for debugging a mnemonic value generator) and for the name of the file containing the list of mnemonics to which to subscribe.
- Modified `gmdataval` to display year values with 4 digits instead of 2; that is, as '`2005`' not '`05`'.
- Fixed bug in telemetry archive playback where if multilple VC's are in the filter list only the first VC would be played back.
- Changed all GMSEC message field names that have NUMBER-OF to NUM-OF per change to GMSEC specification doc 1.4.
- Fixed a bug with appending the message ID to the response message in `gmdataval`. Also changed value of mnemonics from `GMSEC_DOUBLE` to `GMSEC_FLOAT`.
- Fixed a design flaw in the `frame_sorter` telemetry processing application which caused it to archive frames in wrong files if the VCID was corrected by the Reed-Solomon decoder.
- Fixed a bug in extracting packets from AOS frames using a synchronization pattern: Was accounting for an M_PDU header which is not present with this type of data.

## Patch 4

July 25, 2005

## Special Instructions

- There is a bug in this patch which causes the telemetry controller (`tmController`) application to warn erroneously that it '`Could not read reply from remote workstation`' or '`Could not run command on remote workstation`'. These `TM_WARN` messages should be ignored when associated with the `zero` directive or with the end of telemetry archive playbacks.

## Enhancements

- This patch contains the official release of functionality to allow ITOS to interface with the GMSEC bus. The GMSEC capabilties added are the ability to subscribe to directive requests, publish directive requests, publish heartbeat messages, publish log messages, publish telemetry frames, publish telemetry packets, subscribe to telemetry frames and packets, and subscribe to telemetry data value requests and publish telemetry data values. In order to use these programs the user must install the GMSEC API, add the GMSEC API library path to their library path, and set the ITOS GMSEC global variables. These global variables are: `GBL_GMSEC_HOST`, `GBL_GMSEC_MIDDLEWARE_PORT`, `GBL_GMSEC_REQUEST_PORT`, `GBL_GMSEC_TLM_PORT`, `GBL_GMSEC_TLM_FRAME_LENGTH`, `GBL_GMSEC_MIDDLEWARE`, `GBL_GMSEC_SSIP`, `GBL_GMSEC_MISSION`, `GBL_GMSEC_COMPONENT`, `GBL_GMSEC_CONSTELLATION_ID`, `GBL_GMSEC_SAT_ID_PHYSICAL`, `GBL_GMSEC_SAT_ID_LOGICAL`, `GBL_GMSEC_SAT_ID_FACILITY`, `GBL_GMSEC_CLASS`, `GBL_GMSEC_SUBCOMPONENT1`, `GBL_GMSEC_SUBCOMPONENT2`. Setting these globals assists with building the GMSEC message headers and starting the GMSEC programs with the required parameters. There are 3 procedures that come with ITOS that can be used as is or copied and modified to meet user needs. These procedures are: '`gmsec_start.proc`', '`gmsec_sendframes.proc`', and '`gmsec_sendpackets.proc`'.
- Added the STOL `zero` directive, which clears all active telemetry counters.
- Modified the way the telemetry subsystem (specifically, the `frame_sorter` application) limits the amount of queued output data: Previously, if the user requested a limited-depth queue and the queue filled, new messages were discarded. Now the oldest queued message is discarded and the new message is added to the queue.

## Bug fixes

- Bugzilla bug #246 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=246`): The Java `convert` shell script was missing from the '`itos/bin`' directory do to an omission in the '`src/javadisplay/convert/Makefile.am`'.
- Bugzilla bug #247 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=247`): Fixed problem with `FrameSync` program crashing do to

incorrect parsing of "-ch" command line argument between "-check" and "-chan". The program now requires at least 3 characters, i.e. "-che" or "-cha" for uniqueness or an error and exit will occur.

- Problems have arisen with `FrameSync` program due to the addition of code to support the ECL serial interface board from EDT (model SSE), and from adding a status update thread thread that was causing FrameSync to crash on exit. Added the blocking of signals in the status thread. Fixed the terminate function so it won't try to cancel the status thread twice. Added a signal trap for bus error and segmentation violation to stop the EDT DMA before exiting. Fixed a bug with the new "-timeo" option for non-EDT serial input that if the value was zero a time out would occur immediately instead of waiting forever.
- Made minor fixes in the GFEP pages and major upgrades to procs for Glast mission including '`gfepstats.page`', '`fep_frmstats.page`', '`etc/gfep1_frmstats.page`', '`etc/gfep2_frmstats.page`', '`etc/gfep3_frmstats.page`', '`etc/gfep4_frmstats.page`', '`etc/gfep5_frmstats.page`', '`etc/gfep6_frmstats.page`', '`gfep_dirlist.proc`', '`gfep_hotkey.proc`', '`gfep_setup.proc`' and '`gfep_start.proc`'.
- Fixed a bug in the DBIF library to make it safe for applications with mutiple threads running concurrently on mutiple processors. There previously were cases which occasionally caused application crashes or deadlocks.
- Fixed a memory leak bug in `STOL` associated with getting value messagess for the condition in a the '`wait until`' directive.
- Fixed a bug in the dump collector application which caused it to ignore the CTDUMP-DATA item definition for table dump packets which gives the starting offset of the dump data.
- Downgraded a dump timeout event from an error to a warning. In some cases, the timeout is the expected way to end a dump. Also removed an additional, redundant timeout message.
- Eliminated a suprious `NULL_EVENT` message generated by the `fop` application when the FOP transitioned to the active state.
- Improved the `frame_sorter`'s handling of disk full condition on the archive disk. The program now terminates gracefully in this situation, but archives open at the time are not truncated and made read-only. This will have to be addressed in a future update.
- Fixed a bug in the `frame_sorter`'s handling of archives associated with output streams that are not connected when the program exits. Previously, these archives were not truncated and made read-only.
- Fixed a bug in `invoked` causing a memory deadlock when reaping a child process that exited at the same time a new child process is being forked.
- Fixed a bug in `frame_sorter` which caused it not to size memory pools in even multiples of the memory page size.

# Release 7-3 Patches

## Patch 3

June 7, 2005

## Bug fixes

- Bugzilla bug #248 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=248`): Fixed a bug which prevented users from acquiring data (unpacking packets) on CCSDS virtual channels above 7.
- Modified the internal telemetry simulator so it can produce virtual channels above 7 when simulating AOS frames.

## Patch 2

May 10, 2005

## Special Instructions

- New optional DBX files will exist in the '`itos/etc`' directory for the MOC to use when interfacing with the Glast Front End Processor (GFEP). These include '`fep_status.dbx`' which defines the mnemonics and packets for AppIDs 2031, 2032, 2033, 2034, 2035 and 2036. Also '`gfep1_frmstats.page`', '`gfep1_tlmstats.page`', '`gfep2_frmstats.page`', '`gfep2_tlmstats.page`', '`gfep3_frmstats.page`', '`gfep3_tlmstats.page`', '`gfep4_frmstats.page`', '`gfep4_tlmstats.page`', '`gfep5_frmstats.page`', '`gfep5_tlmstats.page`', '`gfep6_frmstats.page`' and '`gfep6_tlmstats.page`' are page displays that use the mnemonics defined in '`fep_status.dbx`' for AppIDs 2031 through 2036.
  If you are going to make use of these definitions you will have to include the '`itos/etc/fep_status.dbx`' in your database build or copy it and make changes in your group dbx records. If you make changes to rename the mnemonics then you will have to copy and change the page definition files as well.
- Programmer's Note: Directory '`src/lib/wrapper`' must have a `"MAKE CLEAN"` done first before the `"MAKE INSTALL"` is done in the '`src`' directory. This is because the optimization option in the '`Makefile.am`' was changed.

## Bug fixes

- Bugzilla bug #235 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=235`): Fixed problem with `dbTmGetDescr()` causing a segmentation fault when the `<*descr>` parameter passed in was NULL. This doesn't currently affect any existing programs but was found when implementing the Java dbif interface for GMSEC.

- Bugzilla bug #236 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=236): Fixed problem with STOL procs getting erroneous 'array subscript out of range' errors on compound IF or DO loops when STOL is scanning for the ENDIF or ENDDO where array mnemonics are referenced.
- Bugzilla bug #237 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=237): Fixed a oversight in the packaging of the ITOS Java classes from release 7.2 to 7.3 for web browser displays of events and pages that would keep them from working because the class could not be found.
- Bugzilla bug #240 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=240): creating a new local variable in STOL that already exists as a mnemonic or global variable causes the new local variable name to be garbage.
- Bugzilla bug #242 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=242): Fixed a bug in decom limit checking that did not handle mnemonics with XPR (lookup table) conversions.
- Added more documentation to the STOL GLOBAL directive.
- Added new DBX files 'fep_status.dbx' which contains optional definitions for FEP status to be used by the MOC and will end up in 'itos/etc' directory and 'gpib.dbx-opt' which contains an optional definition for GBL_GPIBSERPOLL which caused a missing link in our GPIB documentation.
- Added new display pages 'gfep1_frmstats.page', 'gfep1_tlmstats.page', 'gfep2_frmstats.page', 'gfep2_tlmstats.page', 'gfep3_frmstats.page', 'gfep3_tlmstats.page', 'gfep4_frmstats.page', 'gfep4_tlmstats.page', 'gfep5_frmstats.page', 'gfep5_tlmstats.page', 'gfep6_frmstats.page', and 'gfep6_tlmstats.page' to be used by the MOC as examples of accessing the packet data supplied in the 'fep_status.dbx' file. These pages will end up in the 'itos/etc' directory.
- Added support for 2 new states in the fepid discrete conversion in the page 'gfepstats.page' to support SASS_RTE and SASS_PBE for GFEP testing at Spectrum Astro.
- Changed the gfep_startup and gfep_setup procs to change the archive naming scheme to now name the archive directories using the format supplied by Omitron of 'yyyyjjjhhmm' where 'yyyy' is the year, 'jjj' is julian day, 'hh' is the hour or the day, and 'mm' is the minute of the hour.
  '20050010001' would be year 2005, day 1, hour 0, minute 1. Since a pass on the GFEP is started long before the data ever arrives, the files/directories are renamed after the LOS of the pass with a name derived from the actual AOS time. The data product files will be named using the AOS time as the <LEADIN> in the following format 'GFWS_<LEADIN>_'. Archives will build on this format by adding 'VCxx.y' to the file names where 'xx' is the virtual channel number and 'y' is the sequential decimal suffix or 'H' for the archive meta file.
  Using the <LEADIN> example above the archive for VC0 would be named 'GFWS_20050010001_VC0.0' and its meta file would be 'GFWS_20050010001_VC0.H'.
- Fixed a bug in FrameSync for TCP clients trying to bind() a socket when it should only be done for TCP server mode.

- The `FrameEDT` program and all its associated source code was removed since the `FrameSync` can handle most of the same functions and at much higher data rates.
- Added shell scripts '`fepitos`' and '`fep_runevt`' that are used the start ITOS in the Front End Processor mode with minimum processes necessary. There is no STOL event window, no GUI STOL and telemetry and GPIB services are disabled at startup.
- Changed shell scripts '`itos`' and '`itos2`' to put the event PID into a file instead of an environment variable. This was the only process still doing this. Also changed the maximum number of STOL restarts after a crash from 3 to 8.
- Added new global variable for use with `fcopy` in GFEP procs that caused procs '`gfep_dirlist.proc`', '`gfep_hotkey.proc`', '`gfep_setup.proc`', and '`gfep_start.proc`' to change.
- Added support for baud rates that are not in the Posix standard, but supported by operating systems on which ITOS runs.
- Fixed some memory leaks in STOL caused by using `SxEvalString()` and not freeing the created character string.
- Fixed an oversight in telemetry wrapper code for the SMEX wrapper that was not extracting `RS_ENAB` and `RS_ERROR` flags out of the SMEX header. Also added '`-O3`' optimization for the telemetry wrapper library to give the best speed.
- Fixed a bug in STOL in opening the well-known-port so that the file descriptor is changed to `FD_CLOEXEC` after it is open. This keeps it from being passed to other program `exec()`'d from STOL or a `bind()` error if STOL has to restart after a crash.
- Fixed 2 memory leaks in '`invoked`'. One was an `fdopen()` without an `fdclose()` which caused a large memory leak. The other was not freeing an `argv` list used by an `execvp()` call.
- Fixed a bug in `itos_syncheck` (which uses some of the underlying STOL parser and functions) that would crash parsing a proc file do to the STOL name function returning NULL because values aren't set like they are running under STOL. The crash could occur if the `name` function was used on the left hand side of a `LET` directive or in a `GLOBAL` or `LOCAL` directive. This could have potentially caused a crash in STOL given the right conditions.
- Added missing bug fix#234 reference to patch 1 bug fix release notes.
- Fixed a bug involving arrays which caused `itos_term` to crash.

## Patch 1

March 4, 2005

## Bug fixes

- Bugzilla bug #233 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=233`): Modified the dump collector so it no longer requires that mnemonics for copy number or packet size be defined for table dump packets. These already were not required for memory dump packets.

- Bugzilla bug #234 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=234`): Fixed a bug in playback which prevented users from starting a playback after another completes. This was caused by a tmController crash.
- Removed a debug message from libdbif which accidently was left in the GNU/Linux distribution of the release.
- Added the documentation for the new `itos_report_status` application.
- Modified itos_report_status to reset the static flag on mnemonics in the status packet. Because those mnemonics are referenced by a packet definition, `dbxodb` sets them static by default. But, since ITOS generates rather than receives the status packet – something `dbxodb` doesn't know – this mechanism is needed so those mnemonics display normally on local pages.
- Modified playback so it consistently uses `GBL_TM_ARCHPATH` when searching for archive files to play. Some parts of the code still were using `GBL_TM_ARCHDIR`.
- Fixed problems in the level-0 processing applications caused when it tried to overwrite the write-protected archive files. Also modified the program so product files are created read-only.
- Fixed a minor bug in HTML rendering of the database involving empty table cells.
- Reworked the gfepstats page to be more compact. Added more statistics for FASTCopy setup, and changed the packet format for `GBL_FRMSYNC_FPS` so it uses standard data types.
- Added more gfep global mnemonics to fep.dbx-opt to control options used by the gfep_setup proc.
- Added new gfep procs gfep_hotkey.proc & gfep_dirlist.proc which will allow the fep to create and fastcopy system status or an archive directory list to the MOC.
- Changed the gfep_startup and gfep_setup procs to handle LEOT wrapper option for telemetry. Also changed the archive numbering scheme to now name the archive directories using the format '`yyyyjjjnnnn`' where 'yyyy' is the year, 'jjj' is julian day and 'nnnn' is the pass number of the day starting at 1. 20050010001 would be year 2005, day 1, pass 1.
- Fixed bugs with XPR database record processing which would sometimes cause dbxodb to crash.
- Added global mnemonic definitions for controlling AOS packet extraction – specifically, enabling extraction by sync pattern rather than by M_PDU. These were inadvertently left out of the release.
- Modified FrameSync program to allow user to specify a telemetry wrapper to be placed before/after each frame sent to frame_sorter.

# Release 7-3

January 21, 2005

## Highlights

- Implemented the ability to define telemetry mnemonics that are one-dimensional arrays.
- Extended the quicklooklz application so it can produce level-0 telemetry data products.
- Added programs, procs, and documentation to support using an ITOS workstation in the role of a front-end telemetry processor.
- Added a full complement of GMSEC inteface adaptors to allow ITOS to communicate over the GMSEC message bus. New interfaces are being added as new message standards are adopted by the GMSEC project.
- This release of ITOS is supported on SPARC-based computers running Solaris 7, 8, and 9; and on 32-bit x86-based computers running Red Hat Enterprise Linux v.3 and FreeBSD 5.3. It is not supported on other platforms or operating systems.

## Special Instructions

- Due to updates in the Java display components, any existing Java-based displays must be converted for use with this release. Instructions for doing this are in the ITOS User's Guide under section "Top" in *ITOS page conversions*.
- Java 2 SE 1.4.x runtime package is now required for all ITOS versions since Release 7.2 Patch 7. Java 2 SE can be obtained from Sun at `http://java.sun.com/j2se`. J2SE 1.4.2 or newer 1.4.x is recommended. ITOS has not been tested against 1.5. You can select the SDK or the JRE download. If you are not building Java applications then the JRE is all you need. The 1.4.2 downloads are available from Sun at `http://java.sun.com/j2se/1.4.2/download.html`.
- All platforms now require libgcc to be installed. On RedHat Enterprise 3 Linux this is available on the RPMs disk or is available as a package download from the RedHat Network at `https://rhn.redhat.com`. Use the libgcc-3.2.3-39 package. On Solaris, a download is available from Sunfreeware.com website at `http://sunfreeware.com/`. Pick the libgcc-3.3 for the platform of Solaris you are running. Just follow the links in the right hand menu bar.
- ITOS Operational Database files build with previous releases (including 7.3 beta) will not work with this release. Please rebuild existing ITOS ODBs before trying to use them with this release.
- Many collections of scalar ITOS global mnemonics have become arrays. Scalar references to arrays in STOL will be flagged as errors. Array mnemonics include those keeping per-virtual-channel telemetry statistics and command link control word (CLCW) values.
- A new global mnemonic `GBL_TM_ARCHPATH` was added to supercede `GBL_TM_ARCHDIR` to specify a search path list to be used when searching for existing archives. This is

used by the STOL playback directive. `GBL_TM_ARCHDIR` is now used to specifiy the archive output directory only.

- When initializing array mnemonics through '`itosrc`' files, use the underscore character to replace the square brackets of array notation. For example, to give a value for gbl_dev_type[0] in '`itosrc`', use `setenv` to assign the value to the environment variable `ITOS_DEV_TYPE_0_`.

## Known Significant Issues

- ITOS under FreeBSD 5.3 is not ready.
- All `frame_sorter` processes still share the same set of statistical mnemonics. Running multiple frame_sorters – acquiring on multiple sources – will cause each process to overwrite the statistics generated by the others.
- Need to update STOL documentation and '`itosrc`' documentation to include information about arrays.
- STOL directives `IF`, `ELSIF`, and `do while` must be followed by a space before the open parenthesis, or the interpreter will become confused and you will get a syntax error in an apparently random location.
- The STOL-language construction `if (`*expression*`) return` intermittently causes problems and should not be used. Instead, use:

```
if (expression) then
    return
endif
```

- Documentation for using ITOS in the role of a front-end processor is incomplete.
- GMSEC adapters need to be updated to the latest revision of the API.
- Please refer to the ITOS Bugzilla (`http://itos.gsfc.nasa.gov/~bugzilla/`) issue tracking system for additional open issues.

## Enhancements

- Bugzilla enhancement #197 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=197`): Added array support to Java Displays.
- Bugzilla enhancement #199 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=199`): Added new time types TIME44, RTIME44, TIMET42 & RTIMET42 to support GLAST.
- Bugzilla enhancement #200 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=200`): Upgraded the `quicklooklz` program to generate true level-zero products.
- Bugzilla enhancement #201 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=201`): Added to the the frame synchronization program support for reading data from an EDT PCI-SSE interface board.
- Bugzilla enhancement #202 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=202`): Added the global mnemonic `GBL_LOAD_SEQUENCE` to control whether the CCSDS packet grouping flags are used to group commands in a load.

- Bugzilla enhancement #215 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=215`): Upgraded `leditor`, the load editor, to use a configuration file for mission parameters instead of hard-coding them into the program.
- Added `PUSH` and `POP` options to the STOL `LOG` directive. Deprecated the `STOP` option. A log file must be open at all times.
- Modified the STOL `OPEN`, `READ`, and `WRITE` directives so they will not to stop a proc in a fault condition if the `STATUS` option is given.
- Modified STOL `OPEN QUERY` to allow specifying a `STATUS` option for one unit.
- Added an internal STOL function by which the ITOS developers can issue a '`STOL_WARN`' event message. This allows developers to better characterize some events which are not errors.
- Added a new '`STATUS=`*variable*' option to STOL `ENABLE` and `DISABLE` directives that allows the user to get the status of the subsystems as well as the return status of a particular enable/disable directive.
- Added new shell script, '`stubitos`', that starts up a `stubstol` environment. This is similar to the '`itos`' script except only the database, event logger/display and '`stubstol`' STOL interpreter are started. Great for testing out STOL functions and procs!
- Modified the STOL interpreter and `invoked` ITOS daemonso that the PID of a process started with the `SYSTEM` directive is saved in `GBL_SYSTEM_PID` global mnemonic so it can be saved/checked by a proc.
- Changed the STOL `LIMTS` query directive to include the limit set name in the output. Also modified `LIMIT CHANGE` to allow the use of `NAN` or `INF` to turn off a specific limit. Also added the `LIMIT DELETE` option to remove limits from a mnemonic.
- Added the beginings of a STOL restart capability by modifying the itos start scripts and allowing STOL to recover display shared memory and telemetry task PIDs of already running tasks so that telemetry will come back enabled without changing anything. Commands still have to be tackled and currently come up disabled. GPIB also comes up disabled.
- Added enhancement to `sockrw` Perl script to handle binary data transfer.
- Increased the delay between web server display applet `IcheckDSStatus` and the data-point server from 2 to 15 seconds to reduce network traffic and load on server.
- Combined GPIB `deviceDrive` program into stolif/device library eliminating the need for a seperate program and socket connection with STOL.
- Added some additional validation for TLM records in the `dbxodb` program.
- Changed the default temporary directory to '`/var/tmp`' from '`/usr/tmp`'.
- Began supporting ITOS on FreeBSD 5.3, and ended support for ITOS on FreeBSD 4.4.
- Ended support for ITOS for on the Solaris 2.6 operating environment, and on Red Hat Linux 7.2.
- Added `socket_instance_setup()` to the '`libitos_sockets`' library. This function parses command line options to initialize a `socket_instance` structure.
- Modified the ITOS `relay` program so it uses the ITOS sockets library and so it can relay between two sockets.

- Added the `itos_report_status` application which can construct a given CCSDS packet according to it's database definition and send that packet over a socket interface. (This will be used by ITOS when it is in the role of a front-end processor to report its status back to the mission operations center.)
- Added code to support a new DBX '`XPR`' record. This record allows users to specify a telemetry mnemonic conversion in terms of a STOL expression of x. The expression is used to generate a lookup table, which is used to convert an input signed or unsigned integer of up to 14 bits into a floating-point value.
- Modified the `frame_sorter` program so it can call `msync()` periodically to write data to telemetry archives. We had observed that, on GNU/Linux at least, data was written only sometime after each archive segment file was closed. This change allows the user to smooth out the manner in which data is written to the archives. By default, `msync()` will be called for every 1000 memory pages consumed by an archive.
- Modified the `frame_sorter` program to add a '`fifo`' transport. FIFOs are opened non-blocking, whereas files (selected by the '`file`' transport) are opened normally. FIFOs are switched back to blocking mode after they are opened.
- Added examples of the '`%D`' and '`%T`' display format specifications to the ITOS documentation.
- Modified the `frame_sorter` to keep track of how much free space is available on archive file systems. If less than ten times the pool size is available, a warning is generated, and if less than two times the pools size is available, the program exits.
- Incorporated a later version of Steve Duran's Reed-Solomon decoder.
- Modified the DBIF to destroy a channel and clear associated tags if we get a write error on the channel. This eliminates the streaming error messages we get if a sequential print or something like that crashes. The only way to get rid of such errors previously was to restart ITOS.
- Added the ITOS license text to all documents.
- Improved archiver performance by removing some unnecessary `malloc()` and `free()` call pairs.
- Added an experimental '`gpm`' command wrapper which strips the TF header and implements some TF fields in the packet 2ndary header.
- Added the ability to specify escape-sequences as delimiters to the STOL `READ` directive. This will allow users to include '`\r`' as a delimiter as one method of removing it from the input, and to use things like tab ('`\t`') as delimiters.
- Fixed a bug which limited string initial values to 23 characters regardless of the mnemonic size. The limit now is 256 characters.
- Added code to support extracting GLAST science data packets from the VCDU stream. These packets are not contained in M_PDUs, but are prefixed with a synchronization pattern.
- Added global mnemonics and underlying code to report statistics on frame Reed-Solomon error detection and correction, and on telemetry input frame archive statistics. Archive statistics are generated only for CCSDS version 2 VCDUs.

## Bug Fixes

- Bugzilla bug #47 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=47`): Fixed STOL to evaluate the '`critical condition string`' on all commands for which the DBX CMD record field 11 is a 'C' or 'Z'.
- Bugzilla bug #116 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=116`): Added a 5 second timeout to prevent STOL from hanging on GPIB command on Solaris 8.
- Bugzilla bug #148 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=148`): Cleaned up strcpy() and sprintf() calls and fixed a buffer overrun in the GPIB subsystem code.
- Bugzilla bug #162 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=162`): If a load command in a load file fails to supply a required field, ITOS now will decline to send the load.
- Bugzilla bug #175 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=175`): Fixed a bug by which a semicolon in quotes in a STOL `IF` directive in a proc can cause STOL to get lost and generate a spurious error condition and halt the proc.
- Bugzilla bug #176 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=176`): Fixed the bug which caused `GOTO LABEL` statements to fail if the label was indented.
- Bugzilla bug #179 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=179`): The return status value was not being set to 1 when a STOL `WAIT` condition initially true. Also fixed the message issued for a `WAIT` timeout when a condition is not given in the directive.
- Bugzilla bug #186 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=186`): Fixed a bug which cause the GPIB `deviceDriver` program to crash under Linux. Fixed incorrect `malloc()` calls and replaced calls to `sprintf()` and `strcpy()`.
- Bugzilla bug #189 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=189`): Fixed the `FrameSync` program to handle odd length telemetry frames.
- Bugzilla bug #192 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=192`): Fixed a bug which caused the telemetry decom to issue '`packet too short`' errors on archive playbacks, and which required users to manually fix the archive header file so it correctly identifies the packet used to forward the frame operational control field.
- Bugzilla bug #198 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=198`): Acquiring twice on the same source caused `tmController` and `tlmClient` errors and caused `tlmClient` to exit.
- Bugzilla bug #203 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=203`): Fixed the count given when STOL finds multiple instances of a proc in the directories given by `GBL_PROCPATH`.

- Bugzilla bug #204 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=204): Fixed a 'Too many open files' error caused by trying to acquire or playback data with the controller disabled. The error message now causes a STOL operator error to occur that will stop a proc.
- Bugzilla bug #206 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=206): Fixed the STOL syntax checker program itos_syncheck so it now can validate spacecraft commands and handle GOTOs properly.
- Bugzilla bug #211 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=211): Fixed a bug in the STOL expression library which caused the '*' and '/' operators to incorrectly convert 2 unsigned arguments to signed, instead of leaving them unsigned as documented in STOL.
- Bugzilla bug #212 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=212): Fixed the STOL expression library so it can handle decimal integer constants above 2147483647.
- Bugzilla bug #214 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=214): Archive annotations were fixed to show packet header errors and fill data.
- Bugzilla bug #219 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=219): Fixed a bug in the cmd_transmit program which caused it to report a read error when using the e-mail transport. IT was checking the command respose with the wrong variable.
- Bugzilla bug #220 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=220): Updated the cmd_transmit program which was missing some features from the fixes branch. All 2004 fixes branch changes were merged over including GBL_CMD_RESP value of 'ignore', and serial device handling for simultanious telemetry and command.
- Bugzilla bug #222 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=222): Fixed a bug in the STOL SETCOEF directive which caused it to sometime produce apparently random results.
- Bugzilla bug #225 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=225): Fixed a bug in the ULDB command checksum routine which caused it to generate an incorrect checksum when 0xAA appeared in the data.
- Bugzilla bug #226 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=226): Fixed a bug which caused the STOL SETCOEF directive to generate an error when operating on array mnemonics.
- Bugzilla bug #227 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=227): Fixed a bug which caused the STOL LIMITS directive to generate an error when operating on array mnemonics.
- Bugzilla bug #228 (http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=228): Fixed the JAVA page conversion programs so they now work properly to convert displays build under ITOS 7-2 so they will work with ITOS 7-3.

- Bugzilla bug #229 (`http://itos.gsfc.nasa.gov/~bugzilla/show_bug.cgi?id=229`): Fixed `dbxodb` so it handles valid data types U2143, I2143, F2143 and F21436587.
- Fixed a bug found during testing where `tlmClient` was throwing SIGPIPE on DBIF channels when STOL was doing a `wait until` on a global set by `tlmClient` for each packet processed. Also fixed another minor problem in DBIF channel error handling.
- Updated the `stubstol` versions of the `LOG, OPEN, READ and WRITE` directive handlers to match the real handlers, which had been modified previously.
- Fixed the STOL `TOINT()` function so it will not force everything to base 10. If the number is prefaced with a '`0x`', then it will be converted using base 16 as expected.
- Fixed a bug whereby the system would not generate tagged value messages when it set all CVT static flags. This prevented the flag change from being visible in Java displays.
- Fixed a bug in `dbxodb` by which it failed to check that only one record in a limit set has a switch mnemonic.
- Modified STOL so that an attempt to start a proc from a file that does not have read access will output an error message. Previously STOL silently ignored the `START` directive.
- Fixed a bug which prevented parts of ITOS from handling the value '`Inf`' (infinity) as a floating-point value. (The relevant code had been #if'd out of `IsSpecial()` in '`doprintf.c`'.)
- Fixed a bug which caused packet dump to render the secondary header flag as an '`8`' rather than '`1`'.
- Fixed a minor bug whereby `frame_sorter` was not setting the grouping flags in packets created to forward OCF or frame secondary header data to the decom. Now the flags are set to 11 binary.
- Fixed a bug which caused ITOS to report erroneous AOS telemetry VCDU sequence errors when the sequence count rolled over to zero.
- Fixed two database build bugs which caused dbxodb to report incorrectly that the submnemonic table or CVT were full when the number of table entries is very small.
- Fixed a bug in the ITOS sockets library whereby it tried to resolve the INADDR_ANY address (0.0.0.0). This caused problems with acquiring telemtry on some systems which did not have full network connectivity.
- Fixed a memory leak in the application which supports the STOL `snap` directive.

# Release 7-2 Patches

## Patch 10

December 17, 2004

## Bug fixes and changes

- Fixed bugs in `frame_sorter` which caused it to incorrectly transmit long output messages under certain circumstances.
- Modified `frame_sorter` so it discards packets being output if an error occurs while putting wrappers around the packet. Such an error occurs if the packet length exceeds the capacity of the ITP message.
- Modified `frame_sorter` so users can specify the input timeout interval (in seconds). This is the timeout which is activated if an incomplete input message is read: Another part of the message must arrive within the timeout period or frame_sorter will break its input connection. The timeout can be set with the '`-t`' command line argument, or by defining the mnemonic `gbl_tm_input_timeout` in the database and setting it to the desired value.
- Modified `frame_sorter` so it can attempt to reconnect an output upon getting an ECONNRESET error. Previously this was considered an ordinary write error and the output would not try to reconnect.

## Patch 9

October 20, 2004

## Bug fixes

- Fixed Bugzillia item #225. The '`uldbcrc`' checksum routine determined the end of data, and so the bytes over which to run the CRC, by looking for the fill value 0xAA. Obviously, if 0xAA occurs in the data field, this will produce the wrong answer. The number of valid data bytes is provided as part of the command anyway, and that value already was extracted from the command and used to determine overall command length. It should have been – and now is – used to determine the end of data, too.

## Patch 8

Sept 30, 2004

## Bug fixes

- Fixed Bugzillia item #219. There was an error in a comparison in `cmd_transmit` which caused it to try to read back from the command destination just before sending a command, even though the command response type was set to '`ignore`'. When the readback attempt was made, data was available for reading, and the destination was a serial port, a '`read(): Bad file descriptor`' error event was generated because the port is opened for writing only. The comparison has been corrected, so no read will be attempted when the response type is `ignore`.

## Patch 7

Sept 1, 2004

## Special Instructions

- This is a new ITOS platform release for **Rehat Enterprise Linux version 3**. Although it is called patch 7 it is really a full ITOS 7-2 distribution including patches 1 though 6b and patch 7 that was added to make ITOS build on the new platform. On all other platforms patch 7 only contains those items listed in Bug Fixes. Additional global mnemonics were added to the database for SET project that will require the user's database to be rebuilt.
- Additional runtime package required for ITOS is Java 2 Platform not supplied with RedHat distribution. Java 2 SDK can be found at java.sun.com (`http://java.sun.com/j2se`). J2SE 1.4.2 is recommended.

## Enhancements

- Bugzilla bug#195, Choose and implement new Linux distribution for ix86 platforms. Implemented RedHat Enterprise v3 using

```
autoconf 2.13, automake 1.4, aclocal 1.4, gcc 3.2.3-39,
glibc 2.3.2-95, XFree86 4.3.0-35, Openmotif 2.1.30-8, libtool 1.4.3-6,
flex 2.5.4, bison 1.875, jikes 1.15, JLex 1.2.3, perl 5.8.0
j2sdk 1.4.2_03(jre) and Linux Kernel 2.4.21-*.EL
```

- Remote Commanding programs (remcmd) were modified (for ULDB) to create a socket interface to allow ASCII commands to be input into sendcmd from an external source without using the GUI. New itos/etc directory established to hold recvargs, relayargs, and sendargs default setup files for remote commanding programs. Added new itos/pkgs directory to contain the stand-alone remote commanding tar file packages.

## Bug Fixes

### Bug & IDR Details

- Numerous modules had to be modified including the Make system to compile with newer versions of gcc, bison, autoconf and automake.
- Some files found to have poor or questionable coding by new gcc, perl and Java Runtime corrected were

  `tcwtimeyacc.y, sockrw.pl, MneBean.java and dsp_evtdsp.c`
- Fixed a Bugzilla bug#207 in the FrameSync program. When input was defined coming in a comm port and the frame size was small enough for 2 frames to be less than 255 bytes, the program would not process the data until both frames where read. At slow baud rates or when there was large pauses between frames, processing could be greatly delayed. Also fixed a problem with checked frames being thrown away once lock state was reached instead of sending them out. Added -hwhand and -retry options. See *Telemetry frame Synchronization*
- Fixed a bug in cleanup and itos_system that could cause ITOS to shutdown under some circumstances such as "system "cleanup ^xxx"" being issued from STOL.
- Fixed a Bugzilla Bug#210 in convert() in tcwlib. Discrete conversions did not always work properly for 32 bit integers, numbers larger than will fit in a single precision float (23 bits). Truncation and rounding errors would sometimes return the wrong discrete string.
- Fixed a Bugzilla Bug#213 in DBIF and dbxodb that was causing dbxodb to misallocate the static string space for discrete set names. Under unusual circumstances the DBIF would run out of string space or space for discrete sets. Fixed a similar bug in limit sets as well.
- Added program syncSET for SET project including new telemetry status mnemonics gbl_pktsync_stat, gbl_pktsync_lock, gbl_pktsync_drop and gbl_pktflywheel.

## Patch 6b

Jul 25, 2004

## Bug Fixes

- Fixed Bugzilla bug #214 which prevented packet archive annotation headers from indicating when packets were incomplete, and so filled out to the correct length. The same bug also prevented packet archive annotations from showing packet header errors or annotation data from frames after the initial frame with a packet's data.

## Patch 6a

Jun 18, 2004

## Special Instructions

- This patch replaces a incorrect "invoked" task in patch 6 for those that download patch 6 prior to 6/16/04. If you download patch 6 after that date then patch 6a is not needed.

## Patch 6

Jan 12, 2004

## Special Instructions

- This patch adds a new global mnemonic to the ITOS inputs to the database, so we recommend that users rebuild the database after installing this patch or certain new features won't work.

## Enhancements

- Added enhancement for Bugzilla bug #196, Hazardous Commanding. STOL will handle hazardous telecommands with a pop up window and require the user to enter a pass phases matched against a new global mnemonic *GBL_STOLHAZ_PHRASE* which defaults to "yes".

## Bug Fixes

### Bug & IDR Details

- Fixed a minor bug in STOL system directive. Increased the timeout for response from "invoked" from 1 to 3 seconds to keep timeout from occuring on slow or over busy machines. Also fixed some bugs in invoked task not handling the kill request properly.

## Patch 5

Oct 15, 2003

## Bug Fixes

### Bug & IDR Details

- Fixed bugzilla bug #154. The AppID for the secondary header packet now is correctly set in the archive header file for AOS frames.
- Fixed bugzilla bug #183. The system was handling the AOS telemetry virtual frame counter as a byte and not and integer, causing the counter to roll over at 255.
- Fixed bugzilla bug #184. The time code in the Malindi ground station telemety message header now is interpreted correctly.

## Special Instructions

- This patch adds a new global mnemonic to the ITOS inputs to the database, so we recommend that users rebuild the database after installing this patch or certain new features won't work.

## Enhancements

- Added a new feature request by Swift to trigger limit violations on the 1st occurrence of a limit state change instead of 2. This feature is controlled by setting a new global mnemonic `GBL_TM_1STLIM` to 1.

## Bug Fixes

### Bug & IDR Details

- Fixed bugzilla bug #154. The AppID for the secondary header packet now is correctly set in the archive header file for AOS frames.
- Fixed bugzilla bug #183. The system was handling the AOS telemetry virtual frame counter as a byte and not and integer, causing the counter to roll over at 255.
- Fixed bugzilla bug #184. The time code in the Malindi ground station telemety message header now is interpreted correctly.

## Patch 4

August 20, 2003

## Special Instructions

- New features were added to the datapoint server that allow for faster update rates, the host cluster concept and the LET directive. Some changes to '`/etc/hosts.allow`' file required. See Enhancements below.

## Enhancements

- The LET directive was added to the datapoint server to allow remote applications such as LabView to change mnemonic values in the runtime database.
- Modified the ITOS datapoint server to implement the host cluster concept and TCP Wrappers for the datapoint server port. This requires the server host to add 2 new entries to the '`/etc/hosts.allow`' file for *dps_cluster* and *dp_server*. Only hosts listed in the *dp_server* entry are allowed any access to the datapoint server. Only hosts listed in the *dps_cluster* entry can issue a LET directive or attain tag *threshold* of every 0.1 seconds or 10 times a second. Others can only tag mnemonics for thresholds up to once every 5 seconds. The local host may tag mnemonics at 0.01 seconds or 100 times a second and a special case for tag for *flag* equal to 'a' or 'c' the tag threshold may be set to zero (0). An example of these entries could be:

```
dp_server: myhost myhost.my.domain 192.168.1.
dps_cluster: 192.168.1.
```

Notice, localhost or 127.0.0.1 are checked seperately and don't need to be in the above entries. localhost has by default access to all datapoint server features and privileges without adding any entries to the '`/etc/hosts.allow`' file.

- Datapoint server was modified to be more robust and not abort except under extreme fault conditions but do what is reasonable to stay up. Also, event messages to the log are now tagged with the dp_server handle to identify the origin of the messages instead of NULL_EVENT.

## Patch 3a

August 18, 2003

This patch contains files which were mistakenly omitted from Patch 3 along with updates to these release notes. This patch should be installed along with Patch 3.

## Patch 3

August 1, 2003

## Special Instructions

- This patch adds new global mnemonics to the ITOS inputs to the database, so we recommend that users rebuild the database after installing this patch.
- The socket communication improvements added by this patch include additional security provided by TCP Wrappers on server-side TCP sockets for telemetry and command. If your system is using TCP Wrappers, you must update your '`/etc/hosts.allow`' file, adding entries for '`cmd_transmit`' and '`frame_sorter`'. At the very least, add an entry like this:

  ```
  frame_sorter: localhost myhost myhost.my.domain
  ```

  where '`myhost`' and '`myhost.my.domain`' are the unqualified and fully qualified hostnames, respectively, of the computer on which ITOS will run. Please refer to documentation for TCP Wrappers or consult a system administrator. **Note** that if the `frame_sorter` reports in the ITOS event logthat a connection has been '`refused`', it indicates that TCP Wrappers has rejected the connection and you probably need to modify '`/etc/hosts.allow`'. If you do not have a '`/etc/hosts.allow`' or '`/etc/hosts.deny`' you are not using TCP Wrappers and do not need to do anything.
- Due to changes in the the telemetry subsystem, entries in the '`ctrlsource.dat`' files which start the internal simulator ('`tlmFrmSim`') or '`FrameSync`' program must be modified: Add an integer value '`1`' or greater after the '`client_tcp` *host port*'. This is the number of retries allowed, and it usually takes one retry to establish a connection to the telemetry simulator.

# Bug Fixes

## Swift IDRs Fixed

- Swift IDR# 21
- Swift IDR# 36
- Swift IDR# 37
- Swift IDR# 44
- Swift IDR# 81
- Swift IDR# 97
- Swift IDR# 122
- Swift IDR# 126
- Swift IDR# 156

## Bug & IDR Details

- Erroneous end-of-file conditions were reported on a DBIF channel in the data point server when individual packets went static. Any DBIF channel message resulting from a flags change only was generated with zero-valued value length field and no value field. This case was not handled correctly in `dbTmReadChannel()`, which reported end-of-file (`read(x, y, 0)` returns 0) to callers, such as the data point server. The DBIF has been modified in this patch never to generate channel messages without value fields, but also to handle such messages correctly in `dbTmReadChannel()`.
- Fixed a bug in archiving which prevented archive files from closing completely while the associated frame_sorter application was running (in most cases, that is, while telemetry remains enabled). This was manifest as an archive header file being created but the last archive data file not being truncated. Note that packet archives still will not close completely if the associated reassembler is holding a packet fragment, which can happen when some on-board recorders are dumped.
- Fixed another bug in archiving which prevented data from being written to more than one packet archive at a time. The first archive received data, but subsequent archives did not.
- Fixed a bug in the sockets library on operating systems such as Solaris 2.6 and 7 without native `getaddrinfo()` and related functions. The bug was manifest by server-side sockets being bound to the localhost address (127.0.0.1) rather than `INADDR_ANY` (0.0.0.0). This fixes Swift IDR #97, about sending commands on multiple command server ports when ITOS was accepting the connection from the command destination.
- Fixed bugzilla bug #172, which prevented the telemetry subsystem from reporting statistics on CCSDS version 2 (AOS) frame on virtual channels above VC 7. (Swift IDR #126)
- Fixed `dbxodb` so that when building the HTML files for commands, it handles the special case of `GBL_LCLHDR` and does not create a packet map layout since this is not a real command.

- Fixed bugzilla bug #168, involving timing issues with scterm.proc and scfterm.proc cause problems on slow machines. Added retries before an error is generated. Also fixed a bug#181 which was manifest when multiple frame_sorter programs are running.
- Fixed an out of date link in "Getting Started with ITOS/Operating System Requirements" section of the documentation to point to Redhat 7.2 installation document and not 6.1.
- Fixed Bugzilla bug #167, by which `doprintf()` was incorrectly printing the errno digits reversed for the '`%m`' format.
- Fixed Bugzilla bug #171, which caused limits values to be truncated in the HTML pages built by `dbxodb`, in the output of the `lim query` STOL directive, and in the output of the `dump_odb` program. (Swift IDR #36 & #37)
- Modified the '`itos`' start script so that if STOL does not exit cleanly (with non-zero status), the script will not shutdown the rest of the itos tasks or remove the database semaphore. This way, if STOL crashes, everything else continues to run and no `db_lock()` errors are generated.
- Modified the PDB file generation of `dbxodb` to only include command records that are of type '`smex`' since PDB files are only defined for SMEX mission formats. Also, fixed a bug that was adding a blank line after the header line in command PDB files when '`-dtas`' option was included on `dbxodb` command line. (Swift IDR #44)
- Fixed Bugzilla bug #135, by changing `GBL_TM_VCxx_FC` mnemonics from 8 bit to 32 bit unsigned. Swift IDR #21.
- Fixed Bugzilla bug #177 which caused sequential prints to crash when printing mnemonic items with a format fields widths set longer than 80 characters.
- Fixed Bugzilla bug #178 which caused the STOL `limits change` directive to produce unpredictable results on RedHat Linux when adding a new limit for a mnemonic that doesn't have a limit set defined in the database initially.
- Fixed Bugzilla bug #170 which caused STOL to execute a directive from the superceded proc after an interactive `start` directive, or to crash after a `killproc` directive.
- Fixed a bug in library used by `tlmClient` that caused it to hang forever in a read loop if the input socket from `frame_sorter` closed unexpectedly.
- Fixed `create_arch_hdr` program to produce the new archive header format.
- Fixed bug where `quicklooklz` would crash on bad archive file input. (Swift IDR #122)
- Fixed Bugzilla bug #154 (Swift IDR #81) which caused the operational control field packet mapping to be set to zero in the frame archive header file.
- Fixed a bug which prevented ground received time and other packet annotation data from being propagated through by the telemetry system. The latest ground received time is stored in `GBL_AHDRTIME`. This fixes Swift IDR #156.
- Fixed a bug affecting some STOL `query` directives – mainly `archive query` and `acquire query` – which limited the size of the query responses and could cause a STOL crash. This also fixes Bugzilla bug #106.
- Fixed a `file_capture` bug which prevented it from truncating existing files when opening them.

- Fixed a `frame_sorter` bug in the packet reassembler module having to do with packet groups, and which sometimes caused the program to crash.
- Fixed a bug in sequential print which caused it to reject the '`frequency changed`' statement in sequential print definitions.

## Enhancements

- Modified the ITOS telemetry subsystem so it can retry and fail-over client-side TCP connection which break unexpectedly. For information on setting up retries and failovers for the telemetry input socket, see section "What's inside the source configuration file" in *The ctrlsource.dat file*. For information on setting up telemetry output connections, see the section "Telemetry Output" in *Telemetry & Command Interfaces Guide*.
- Modified commanding so that a global mnemonic `GBL_CMD_RESP` value of "ignore" means that cmd_transmit will not open the command destination for reading, and will not read from the command destination. If the value is the empty string or "none", it will read and discard anything sent from the command destination.
- Added the `RRAW` STOL directive needed by ULDB.

## Patch 2

December 23, 2002

## Special Instructions

- This patch adds new, required global mnemonics to the ITOS inputs to the database, so users must rebuild the database after installing this patch.

## Bug Fixes

- Fixed Bugzilla Bug# 130, creating packet archives during a play back failed to put annotation into the archive was fixed.
- Added new option to `ARCHIVE` directive to specify '`WRAPPERS=`*wrapper list*' for packet archives. This is part of the overall change to allow annotation to be added to packet archives in bug# 130 fix.
- Deprecated the packet archive annotation specification in the '`ctrlsource.dat`' file. Updated ctrlsource.dat documentation to reflect this and other recent changes.
- Updated Malindi header handling for command and telemetry according to the ICD dated July 2002. Completes bugzilla enhancement requirement #41.
- Enabled simultaneous command connections under the "SERVER_TCP" transport. Active connections are selected via GBL_CMD_PORTSW.
- Fixed STOL library function `ATODATE` to handle years prior to 1968 properly. Valid date range is 1902 to 2038. All 2 digit years from 00 - 38 are in the year 2000. 39 - 99 are assumed in 1900.

- Made minor changes to "ITOS User's Guide" documentation for Archive wrappers and added the ITOS version number to main page.
- Fixed Bugzilla bug #50, a minor annoyance in the startup of Java Display IJServer taking 10 seconds before getting the socket server port open. This caused problems with having Java displays as base pages opened at STOL startup getting a connection refused.
- Removed unsolicited event messages when attempting to access the command packet grouping specification file.
- Fixed Bugzilla Bug#164, tlmClient crashes on limit switch mnemonics with NO VALUE.
- Fixed Bugzilla Bug#165, STOL doesn't recognize signed string numbers as numbers.

## Enhancements

- none.

## Patch 1

September 27, 2002

## Special Instructions

- The arguments accepted by the `file_capture` application are modified by this patch. Specifically, there should no longer be an argument to the '`-s`' option. STOL procedures which start `file_capture` with the '`-s`' option must be modified by the user to delete the exising argument to '`-s`'. For example, '`file_capture -s 5 -c`' becomes '`file_capture -s -c`'.
- We recommend that users rebuild the database after installing this patch, but it is not strictly required. If the database is not rebuilt, users will notice that the '`idle frames`' on the `tlmstats` page will not display.

## Bug Fixes

- Fixed bugzilla bug#153 in STOL. Using write directive with status option causes STOL to crash under RedHat Linux.
- Fixed bugzilla bug#157, load_env crashes when handling ITOS environment variables of type time or date.
- Fixed bugzilla bug#158, Specifying filter options in playback of AOS frames doesn't work do to playback looking for VC number in wrong place in frame.
- Modified `file_capture` for Swift Large Data Product (LDP) collection:
  - Dropped the timeout argument to the '`-s`' option that turns on Swift LDP processing.

  - Modified the method by which the LDP collection software determines the end of product so a timeout is not used: The software assumes a product being received has ended if the product number changes; if a non-zero file size was given in page one of the product, and the highest page number for the product is received; and if a zero file size was given in product page one, and page one is repeated.
  - Dropped the two-byte file size field from the file header when saving LDPs to the disk.
- Updated *The '*`ctrlsource.dat`*' file* (`../tmcConfig/Top.html`) document to reflect the new method for specifying the packet IDs in which the `frame_sorter` is to forward the frame secondary header and operational control field to the decom.
- Added a new "uldb" setup option for serial commanding. The option enables active control of the serial port RTS line according to ULDB program requirements. See documentation for GBL_CMD_SERIAL in ITOS Globals. Fixed the timing on the RTS control so that the line remains high for at least 100ms after the last command bit has been sent.
- Deleted a warning about unexpected idle frames in the CCSDS packet extraction code. It is legal to intersperse idle frames among data-carrying frames on a virtual channel.
- Added global mnemonics and code to allow the telemetry software to report the count of idle frames on each virtual channel. On the tlmstats page replaced rejected frame counts with idle frame counts. Frame rejection is not fully implemented and so rejected frame counts always are zero. These statistic mnemonics are only defined by default for the first 8 virtual channels. If the user wants statistics for anything above VC7 they will have to add the dbx records to their database definitions for GBL_TM_VCxx_CRCE, GBL_TM_VCxx_FC, GBL_TM_VCxx_IDLE, GBL_TM_VCxx_IN, GBL_TM_VCxx_REJ, GBL_TM_VCxx_SEQE, GBL_TM_VCxx_SIDE, GBL_TM_VCxx_VERE where 'xx' is the VC number. Then make a copy for tlmstats.page and edit it to contain the virtual channel mnemonics they are interested in.

# Release 7-2

August 13, 2002

## Special Instructions:

- This release includes a major restructuring of the ITOS Operational Database. Users must re-build databases before using them with this release.

## Enhancements

- Added enhancement to STOL `WAIT` directive to specify a status variable to hold the exit status of the WAIT directive.
- Modified STOL so it accepts shell-style wildcard notation in `gbl_procpath`. This capability was provided for displays in the most recent patch. See `Release 7-1 Patch3 Enhancements`.
- Added ability to use "playback" as the station(telemetry source) option when using the archive, tfdump, and pktdump STOL directives during archive replay.
- Added a document for assorted essays concerning ITOS.
- Database has been modified to be self sizing which removes limitations on the numbers of mnemonics, packets, etc. Most limitations have been removed for names and string lengths with the following exceptions to limit software structure sizes:

```
Telemetry records:
    Mnemonic names           - 255 characters.
    Mnemonic units           - 64 characters.
    Mnemonic string values   - unlimited.
    Limit set names          - 255 characters.
    Conversion set names     - 255 characters.
    Discrete value strings   - 255 characters.
    Maximum Packet size      - 65529 bytes.
Command records:
    Mnemonic names           - 255 characters.
    Field names              - 255 characters.
    Submnemonic names        - 255 characters.
    String Submnemonic value - 255 characters.
    Conditional critial exp  - 255 characters.
    Checksum routine names   - 255 characters.
    End item verification    - 255 characters.
    Action routines          - 255 characters.
All records:
    Short descriptions       - 64 characters.
    Subsystem list           - 255 characters.
    Subsystems per list      - 16.
```

- Added stronger syntax checking for some items in dbxodb as well as added more warning messages. You may see a lot more error errors and warnings than before so be aware.

- Added additional functionality to dump_odb program primarily used in database testing.
- GUI Stol (gstol) is now invoked with the start of ITOS automatically and window spacing has been adjusted to keep it under the Stol window.
- Added a resource to the Stol resource file for the default iconic state of proc windows other than the top level proc. If **"Proc.iconic: on"** is added to the users '`.Xdefaults`' file, all but the first proc window will be started in the icon state instead of the window open.

## Bug Fixes

- Fixed Bugzilla bug #127 & 147, AOS (CCSDS version 2) telemetry archiving and and archive playback.
- Fixed Bugzilla bugs #130, A packet archive of one App ID was missing annotation headers.
- Fixed Bugzilla bugs #132 and #133 which fixed problems with long mnemonics and command sequences being truncated in the sentq displays .
- Fixed Bugzilla bug #134 where sentq page was not being cleared and then initialized properly when cmds are disabled and then enabled. Now you don't have to stop and restart the sentq page to get it to work properly.
- Fixed Bugzilla bug #139: `dbxodb` default epoch was not being applied to a PKT record if src type (field 7) was not specified.
- Fixed Bugzilla bug #142, the `iscommand()` function documentation in SX to indicate it always returns 0 when called from STOL.
- Fixed Bugzilla bug #145: `dbxodb` now warns the user about bad record types rather than just ignoring them without letting the user know.
- Fixed Bugzilla bug #146. Made serveral cosmetic changes in Quicklooklz per user request. Added option for sort type.
- Fixed Bugzilla bug #149: `dbxodb` sometimes truncates submnemonic value range in SR PDB file when value is too large.
- Fixed Bugzilla bug #150 where PDB submnemonic float values that were too large where displaying "Inf" instead of MAX FLOAT.
- Fixed Bugzilla bug #151 where multiple display pages of the same name in the page path were not generating a warning message.
- Modified handling of telemetry packet groups so that the concatenation process optionally will drop packet secondary headers from all but the first packet. Added a third column to the configuration file in which users may give the secondary header length, indicating that it should be dropped.
- Added '`command.dbx`' HTML descriptions for GBL_CMD_SERIAL and GBL_CMD_FILE mnemonics and fixed 2 TLM records containing an extra '|' before the description field.
- Fixed bug in the STOL `WAIT` directive in cases when the *howlong* value is negative. STOL now gives a warning message and ignores the wait. Also, STOL now gives a

different event message when a proc resumes after "wait until" times out than it gives when the "until" expression becomes true.

- Modified the syntax of '`ctrlsource.dat`' to allow users to specify the ID of the packet used to forward the incoming CCSDS (including AOS) frame's OCF (usually the CLCW) and that used to forward the secondary header (aka insert zone).
- Dropped the ability for giving the frame and packet time locations in ctrlsource.dat. As of Release 7-1, users can specify the location of packet time stamps in the DBX '`map`' record. Specify the location of the frame time stamp by specifying it's location in the packet which is used to forward frame secondary header information to the decom.
- Added handling of Swift Large Data Product (LDP) file downlinks within the `file_capture` application. The LDP data is not piped to the `decode_ldp` application, which has been removed from the system. This fixes the problem where `decode_ldp` receives partial packets at the beginning of the second product when products are telemetered back-to-back at more than a very slow rate. Also modified the '`ldp.proc`' which starts LDP file captures.
- Fixed a bug in cmd_dump which caused to incorrectly calculate `CxDUMPPKTSI` when that mnemonic is not defined in the dump packet.
- Fixed an intermittent bug in `cmd_transmit`'s serial port setup.
- Fixed a bug is the Sx library that would crash Stol if the user tried to used array notation, i.e. "[0]", in a Stol directive.